I claim:

1. An automated process for coloring a superpixel, defined within a computer aided design system, containing a specified number of constituent pixels N and using a pre-defined set of process colors, for use in coloring a pattern area having a specified target color, said process comprising the steps of:

   a. defining a combination of said process colors, each of said process colors having an individually specified concentration to be assigned to said superpixel that, when blended together, will produce said target color, wherein said assignment of process colors to specific constituent pixels is constrained by a minimum specified concentration; and

   b. determining, within said combination of said process colors of Step (a), an assignment of specific concentrations of said process colors to specific constituent pixels that produces a desired distribution of colorants within said superpixel.

2. The process of Claim 1 comprising the additional step of determining the color component values of said set of process colors and the color component values of said target color.

3. The process of Claim 2 comprising the additional step of displaying said target color on a computer monitor.

4. The process of Claim 2 wherein said pattern area is on an absorbent substrate, and wherein said color component values of said process colors, as defined, include an accommodation for the reflectivity of said substrate.

5. The process of Claim 4 wherein said accommodation involves the use of the Kubelka-Munk k over s relationship.

6. The process of Claim 5 wherein said accommodation includes wicking characteristics.

7. The process of Claim 5 wherein said accommodation includes density characteristics.

8. The process of Claim 1 wherein, in Step (b), said assignment of specific concentrations of said process colors results in an assigned total concentration of process colors within a constituent pixel that exceeds 100 percent.

9. The process of Claim 1 wherein said desired distribution is one that maximizes the uniformity of said distribution of colorants within said superpixel.

10. The process of Claim 1 wherein, in Step (b), said desired distribution is determined using a Sum of Squared Deviations calculation.

11. The process of Claim 1 wherein, in Step (b), said assignment of specific concentrations of said process colors is made by successive rotations of a Bayer Threshold Order Array for each colorant in order to minimize a Sum of Squared Deviations calculation.

12. The process of Claim 1 wherein said superpixel is used to tile a uniformly colored pattern area.

13. The process of Claim 2 wherein said superpixel is used as a dithering element to color a pattern area.

14. The process of Claim 1 wherein, in Step (b), said combination of process colors includes a specified concentration of a specific process color that is less than said minimum specified concentration, and which is greater than said minimum specified concentration divided by N, and wherein said specific process color is non-uniformly assigned among said N constituent pixels.

15. The process of Claim 2 which further includes the following step:

    d. displaying said pattern containing said superpixel on a computer monitor.

16. The process of Claim 15 which includes displaying individual pixels comprising said superpixel, prior to inter-pixel commingling, on a computer monitor.

17. The process of Claim 15 which further includes the step of automatically generating instructions for actuating colorant applicators to reproduce said pattern displayed on said monitor on said absorbent substrate.

18. A process for coloring a superpixel, containing a specified number of constituent pixels N and using a pre-defined set of process colors, for use in coloring a pattern area having a specified target color, said process further providing for the display of said target color expressed by said superpixel, comprising the steps of:

    a. defining the color component values of said process colors;

b. defining a combination of said process colors of specified concentrations to be assigned to said superpixel that, when blended together, will produce said target color, wherein said assignment of process colors to specific constituent pixels is constrained by a minimum specified concentration;

c. determining the color component values of said target color; and

d. determining, within said combination of said process colors of Step (b), an assignment of specific concentrations of said process colors to specific constituent pixels that produces a desired distribution of colorants within said superpixel.

19. The process of Claim 18 wherein said pattern area is on an absorbent substrate, and wherein said color component values of said process colors, as defined, include an accommodation for the reflectivity of said substrate.

20. The process of Claim 19 wherein said accommodation involves the use of the Kubelka-Munk k over s relationship.

21. The process of Claim 20 wherein said accommodation includes wicking characteristics.

22. The process of Claim 20 wherein said accommodation includes density characteristics.

23. The process of Claim 18 wherein, in Step (d), said assignment of specific concentrations of said process colors results in an assigned total concentration of process colors within a constituent pixel that exceeds 100 percent.

24. The process of Claim 18 wherein said distribution is one that maximizes the uniformity of said distribution of colorants within said superpixel.

25. The process of Claim 18 wherein said desired distribution is determined using a Sum of Squared Deviations calculation.

26. The process of Claim 18 wherein, in Step (d), said assignment of specific concentrations of said process colors is made by successive rotations of a Bayer Threshold Order Array for each colorant in order to minimize a Sum of Squared Deviations calculation.

27. The process of Claim 18 wherein said superpixel is used to tile a uniformly colored pattern area.

28. The process of Claim 18 wherein said superpixel is used as a dithering element to color a pattern area.

29. The process of Claim 18 wherein, in Step (b), said combination of process colors includes a specified concentration of a specific process color that is less than said minimum specified concentration, and which is greater than said minimum specified concentration divided by N, and wherein said specific process color is non-uniformly assigned among said N constituent pixels.

30. The process of Claim 18 which further includes the following step:

    e. displaying said target color containing said colored superpixel on a computer monitor.

31. The process of Claim 30 which further includes displaying individual pixels comprising said superpixel, prior to inter-pixel colorant commingling, on a computer monitor.

32. The process of Claim 30 which further includes the following step:

    f. automatically generating instructions for actuating colorant applicators to reproduce said pattern displayed on said monitor on said absorbent substrate.

33. The process of Claim 32 wherein said instructions are sent to an array of liquid colorant applicators, each applicator being adapted to apply a liquid colorant that corresponds to a process color onto an absorbent substrate in accordance with said generated instructions.

34. For a desired pattern containing a target color, a process for reproducing said target color in pixel-wise fashion on an absorbent substrate using a pre-defined set of process colorants, each of said process colorants expressing a specified process color, said target color being expressed through the formation of at least one superpixel, said superpixel being comprised of a group of contiguous individual pixels to each of which an individual color may be assigned, said assignable individual color corresponding to the inherent color of said substrate as modified by the optional direct application of process colorant, as required by said pattern, to said substrate in pixel-wise fashion, said direct application being constrained to quantities of process colorant that exceed a threshold minimum colorant application quantity, said process comprising the steps of:

    a. specifying the color component values of each process color represented by said set of process colorants, in combination with the color component values

associated with said absorbent substrate;

b. specifying the target color in terms of a blend of process colorants, said blend being specified by concentration values of component process colorants;

c. specifying the number N of individual pixels comprising said superpixel;

d. determining appropriate proportions of said component process colorants to be applied to said individual pixels comprising said superpixel to form a process colorant blend that expressed said target color, wherein all such proportions involve process colorant concentrations that are greater than said threshold minimum colorant application quantity; and

e. constructing said superpixel by assigning specific concentrations of said component process colorants to specific individual pixels comprising said superpixel;

35. The process of Claim 34 wherein said superpixel is used to tile a uniformly colored pattern area.

36. The process of Claim 34 wherein said group of pixels express a target color as a dithering element in a dithered image.

37. The process of Claim 34 wherein said generated color component values accommodate selected physical characteristics of said absorbent substrate, and wherein said characteristics include those that determine substrate reflectivity.

38. The process of Claim 37 wherein said accommodation involves the use of the Kubelka-Munk k over s relationship.

39. The process of Claim 37 wherein said selected physical characteristics of said absorbent substrate include wicking characteristics.

40. The process of Claim 37 wherein said selected physical characteristics of said absorbent substrate include density characteristics.

41. The process of Claim 34 wherein the collective colorant concentration values of said pixels within said superpixel is about 100%.

42. The process of Claim 34 wherein the collective colorant concentration values of said pixels within said superpixel is greater than 100%.

43. The process of Claim 34 wherein said superpixel is constructed using a 2x2 Bayer Threshold Order Array.

44. The process of Claim 34 wherein said colorants are distributed within said superpixel to maximize the uniformity of the distribution of colorants within said superpixel.

45. The process of Claim 44 wherein the uniformity of said colorant distribution is determined using a Sum of Squared Deviations calculation.

46. The process of Claim 34 wherein, in Step (e), said assignment of specific concentrations of said process colors is made by successive rotations of a Bayer Threshold Order Array for each colorant in order to minimize a Sum of Squared Deviations calculation.

47. The process of Claim 34 wherein said pattern is constructed using at least one target color expressed through the formation of at least one superpixel and is displayed as a digitally defined image on a computer monitor.

48. The process of Claim 47 which includes displaying individual pixels comprising said superpixel, prior to inter-pixel colorant commingling, on a computer monitor.

49. The process of Claim 34 wherein said assignment of specific concentrations of component process colorants to specific individual pixels is converted to instructions for actuating an array of dye applicators that collectively direct said process colorants onto said substrate surface in accordance with said pattern.